# Volunteer Lake Assessment Program Individual Lake Reports

## LAUREL LAKE, FITZWILLIAM, NH

**MORPHOMETRIC DATA**

| | | | | | |
|---|---|---|---|---|---|
| **Watershed Area (Ac.):** | 768 | **Max. Depth (m):** | 14.1 | **Flushing Rate (yr$^{-1}$):** | 0.4 |
| **Surface Area (Ac.):** | 155 | **Mean Depth (m):** | 6.1 | **P Retention Coef:** | 0.78 |
| **Shore Length (m):** | 3,500 | **Volume (m$^3$):** | 3,826,000 | **Elevation (ft):** | 1099 |

**TROPHIC CLASSIFICATION**

| Year | Trophic class |
|---|---|
| 1992 | MESOTROPHIC |
| 2006 | OLIGOTROPHIC |

**KNOWN EXOTIC SPECIES**

**The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.**

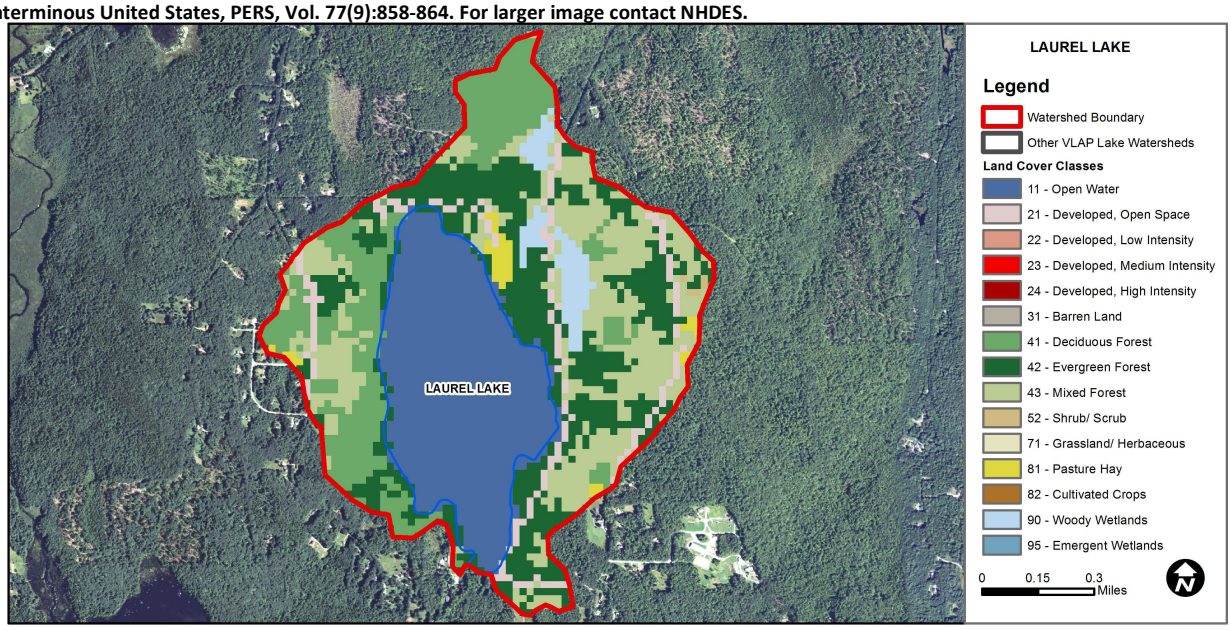
| Designated Use | Parameter | Category | Comments |
|---|---|---|---|
| Aquatic Life | Phosphorus (Total) | Good | >/=5 samples and median is < threshold but > 1/2 threshold value. |
| | pH | Bad | >10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin. |
| | D.O. (mg/L) | Encouraging | < 10 samples and no exceedance of criteria. More data needed. |
| | D.O. (% sat) | Encouraging | < 10 samples and no exceedance of criteria. More data needed. |
| | Chlorophyll-a | Good | >/=5 samples and median is < threshold but > 1/2 threshold value. |
| Primary Contact Recreation | E. coli | Good | Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred. |
| | Chlorophyll-a | Good | At least 10 samples with 1 sample but < 10% of samples exceeding criteria. |

**BEACH PRIMARY CONTACT ASSESSMENT STATUS**

| | | | |
|---|---|---|---|
| LAUREL LAKE - CAMP FLEUR DE LIS BEACH | E. coli | Very Good | All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria. |
| LAUREL LAKE - TOWN BEACH | E. coli | Bad | >/=1 exceedance(s) of geometric mean criterion and/or >/=2 exceedances of single sample criterion, with 1 or more >2X criteria. |

**WATERSHED LAND USE SUMMARY**

**Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.**




| Land Cover Category | % Cover | Land Cover Category | % Cover | Land Cover Category | % Cover |
|---|---|---|---|---|---|
| Open Water | 28.0 | Barren Land | 0 | Grassland/Herbaceous | 0 |
| Developed-Open Space | 5.42 | Deciduous Forest | 17 | Pasture Hay | 1.46 |
| Developed-Low Intensity | 0 | Evergreen Forest | 23.68 | Cultivated Crops | 0 |
| Developed-Medium Intensity | 0 | Mixed Forest | 20.99 | Woody Wetlands | 3.44 |
| Developed-High Intensity | 0 | Shrub-Scrub | 0.17 | Emergent Wetlands | 0 |

# VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
## LAUREL LAKE, FITZWILLIAM, NH
## 2013 DATA SUMMARY

**OBSERVATIONS AND RECOMMENDATIONS** (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **CHLOROPHYLL-A:** Chlorophyll levels were low, less than the state median and stable throughout the summer. Historical trend analysis indicates significantly decreasing (improving) chlorophyll since monitoring began. We hope to see this continue!
- **CONDUCTIVITY/CHLORIDE:** Average deep spot and Keene Ave. tributary conductivity levels were low and approximately equal to the state median. Historical trend analysis indicates significantly decreasing (improving) epilimnetic conductivity since monitoring began. We hope to see this continue!
- **E. COLI:** E. coli levels at all stations were well below state standards for public beaches and surface waters on each sampling event.
- **TOTAL PHOSPHORUS:** Epilimnetic and Metalimnetic phosphorus levels were low on each sampling event. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Hypolimnetic phosphorus levels were slightly elevated by August and the turbidity was also slightly elevated indicating the potential release of phosphorus and organic compounds from bottom sediments under low dissolved oxygen conditions. Keene Ave Trib phosphorus was elevated but relatively low compared to historical data.
- **TRANSPARENCY:** Transparency was low in June likely due to high water levels, recent rain events, and pollen noted throughout the water column. Transparency improved in July and August; however historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began. Viewscope transparency was better than non-viewscope transparency suggesting that viewscope transparency was more representative of actual conditions.
- **TURBIDITY:** Hypolimnetic turbidity was slightly elevated in August potentially due to organic compounds released from bottom sediments under low dissolved oxygen conditions. Turbidity at all other stations was low.
- **PH:** Average epilimnetic pH was sufficient to support aquatic life; however pH levels at all other stations were less than desirable range 6.5 – 8.0 units. Historical trend analysis indicates stable epilimnetic pH with low variability between years.
- **RECOMMENDED ACTIONS:** The improving chlorophyll and epilimnetic conductivity are positive signs. The increased frequency of high volume, high intensity storm events highlights the importance of managing stormwater runoff in the watershed. Continue to educate lake and watershed residents on ways to reduce stormwater runoff from their properties utilizing DES' "Homeowner's Guide to Stormwater Management". Keep up the great work!

Table 1. 2013 Average Water Quality Data for LAUREL LAKE

| Station | Alk. | Chlor-a | Chloride | Cond. | E. Coli | Total P | Trans. | | Turb. | pH |
|---|---|---|---|---|---|---|---|---|---|---|
| | mg/l | ug/l | mg/l | uS/cm | #/100ml | ug/l | m | | ntu | |
| | | | | | | | NVS | VS | | |
| Epilimnion | 3.20 | 3.23 | 7 | 42.9 | | 4 | 5.33 | 5.88 | 0.55 | 6.53 |
| Metalimnion | | | | 43.6 | | 7 | | | 0.67 | 6.27 |
| Hypolimnion | | | | 46.2 | | 14 | | | 1.03 | 5.81 |
| Keene Ave Trib | | | | 40.9 | 30 | 38 | | | 0.89 | 5.10 |
| Keene Ave Trib Before Lake | | | | | 10 | | | | | |
| Keene Ave Trib In Lake | | | | | 9 | | | | | |
| North Beach | | | | | 5 | | | | | |
| South Beach | | | | | 9 | | | | | |
| Swim Club | | | | | 13 | | | | | |

**NH Median Values:** Median values for specific parameters generated from historic lake monitoring data.
**Alkalinity:** 4.9 mg/L
**Chlorophyll-a:** 4.58 mg/m$^3$
**Conductivity:** 40.0 uS/cm
**Chloride:** 4 mg/L
**Total Phosphorus:** 12 ug/L
**Transparency:** 3.2 m
**pH:** 6.6

**NH Water Quality Standards:** Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
**Chloride:** < 230 mg/L (chronic)
**E. coli:** > 88 cts/100 mL – public beach
**E. coli:** > 406 cts/100 mL – surface waters
**Turbidity:** > 10 NTU above natural level
**pH:** 6.5-8.0 (unless naturally occurring)

### HISTORICAL WATER QUALITY TREND ANALYSIS

| Parameter | Trend | Explanation | Parameter | Trend | Explanation |
|---|---|---|---|---|---|
| pH | Stable | Trend not significant; data show low variability. | Chlorophyll-a | Improving | Data significantly decreasing. |
| Conductivity | Improving | Data significantly decreasing. | Transparency | Degrading | Data significantly decreasing. |
| | | | Phosphorus (epilimnion) | Stable | Trend not significant; data moderately variable. |